IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of	:	**Confirmation No. 8459**
Morten SYSLAK et al.	:	Attorney Docket No. 2005_1455A
Serial No.10/549,673	:	Group Art Unit 1793
Filed December 1, 2005	:	Examiner Mark L. Shevin
A METHOD FOR PRODUCING ALUMINUM ALLOY SHEET MATERIAL AND AN ALUMINUM ALLOY SHEET	:	**Mail Stop: Appeal Brief - Patents**

APPEAL BRIEF

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO 23-0975

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of claims 1-6, 12-16 and 18-21.

Real Party in Interest

The real party in interest is NORSK HYDRO ASA, Assignee of the above-identified application, by virtue of an Assignment recorded December 1, 2005 in the present application.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

The only claims pending in the application are claims 1-16 and 18-21. Claims 7-11 have been withdrawn from consideration as being directed to subject matter which was non-elected in

response to a requirement for restriction. Accordingly, the claims on appeal are claims 1-6, 12-16 and 18-21, which are set forth in the Claims Appendix attached hereto. All of these claims are rejected.

Status of Amendments

No amendments to the claims were made subsequent to final rejection.

Summary of Claimed Subject Matter

The only independent claim on appeal is claim 1, which is directed to a method of producing aluminum sheet material (page 3, lines 4-5) which comprises continuous strip casting of a sheet at a predetermined solidification rate (page 4, lines 23-24) ensuring material microstructure exhibiting primary particles having average size below 1 micrometer^2 (page 5, lines 9-12), and cold rolling of the strip cast sheet to an appropriate gauge with optionally intermediate annealing during the cold rolling (page 4, lines 8 and 25).

Grounds of Rejection to be Reviewed on Appeal

Whether claims 1-2, 6 and 20 are unpatentable under 35 U.S.C. §103(a) over Jin et al. (US 6,238,497) in view of Fukuda et al. (US 6,261,706).

Whether claims 3 and 12 are unpatentable under 35 U.S.C. §103(a) over Jin et al. (US '497) in view of Fukuda et al. (US '706) further in view of Jin et al. (US 6,531,006).

Whether claims 4 and 5 are unpatentable under 35 U.S.C. §103(a) over Jin et al. (US '497) in view of Fukuda et al. (US '706) further in view of Zeigler et al. (US 3,827,917) and ASM Handbook (Heat Treating of Aluminum Alloys, Annealing, in ASM Handbook (revised Vol. 4) Metals Handbook (1998).

Whether claims 13-16 and 18-20 are unpatentable under 35 U.S.C. §103(a) over Jin et al. (US '497) in view of Fukuda et al. (US '706) in view of Jin et al. (US '006), Zeigler et al. (US '917) and ASM Handbook.

Argument

Rejection of claims 1-2, 6 and 20 under 35 U.S.C. §103(a) as being unpatentable over Jin et al. (US '497) in view of Fukuda et al. (US '706)

The Examiner has not disputed the fact that the feature of claim 1 relating to the "material microstructure exhibiting primary particles having average size below 1 micrometer^2" is new, as none of the cited references define a method of producing aluminium alloy sheet material with such microstructure.

Thus, the Examiner states that US '497 specifically links the average cooling rate with the size of intermetallic particles produced, but does not teach what constitutes large particles. The Examiner then refers to the Fukuda et al. reference as disclosing that the line for "large" particles is drawn at 1 micron^2 of circle equivalent diameter, and takes the position that it would have been obvious to combine US '497 with Fukuda et al. and continuous Al strip such that the intermetallic particles have an average size "below above 1 micrometer^2", because both references recognized the relationship between the casting rate and formation of intermetallic particles when continuously casting Al strip stock for heat exchanger components.

However, although US '497 teaches that iron in the aluminum alloy forms inter-metallic particles during casting that contribute to particle strengthening, this reference does not at all disclose or even suggest the importance of "a predetermined solidification rate ensuring material microstructure exhibiting primary particles having average size below 1 micrometer^2" as defined in claim 1 of the present application, and which is of utmost importance to avoid an increase in pitting corrosion in the vicinity of the Fe-bearing particles, which is detrimental to the corrosion performance of the alloy.

The US '497 reference is concerned with a totally different problem/solution than the present invention, namely that if the average cooling rate is less than 10° C/sec, the intermediate particles formed during casting **will be too large and cause rolling problems**. The US '497 reference does not at all disclose or suggest that there would be a problem with increased pitting

corrosion if the size of the Fe-bearing particles of the cathodic area in the alloy was increased.

Fukuda et al. teach an aluminium alloy clad material as tube material or header material for heat exchangers that exhibits superior strength after brazing and excellent corrosion resistance, and where a sacrificial anode material may be clad onto an aluminium strip possessing a prescribed number of large Si and Fe intermetallic particles which are present to preferentially corrode and thereby protect the inner layer through galvanic protection. This represents a totally different solution to prevent corrosion than the present invention, and suggesting a combination of US '497 and Fukuda et al. is based on hindsight reasoning, which is strictly prohibited in judging the patentability of a claimed invention. The fact that Fukuda et al. teach the use of a sacrificial clad to control corrosion, instead of material microstructure exhibiting primary particles having average size below 1 micrometer^2 as in the present invention, proves the fact that the present invention as defined in the claims is not obvious from these references.

The present invention is concerned with a totally different problem and solution, namely to produce an aluminium alloy sheet material at a predetermined solidification rate to ensure material microstructure exhibiting primary particles having average size below 1 micrometer^2 to avoid an increase in pitting corrosion in the vicinity of the Fe-bearing particles. Thus, with the present invention the aim is to produce an alloy with small particles and which as such is corrosion resistant, whereas Fukuda et al. are concerned with an aluminium alloy with large particles designed to corrode and to be clad to another aluminium alloy. US '497 does not deal with corrosion at all, but rather with large particles causing rolling problems, and combining these two references in the manner suggested by the Examiner would not occur, and in fact would be meaningless, to one of ordinary skill in the art.

The Examiner argues that both US '497 and Fukuda et al. recognize the relationship between the casting rate and formation of intermetallic particles when continuously casting Al strip stock for heat exchanger components. The fact is however that neither one of these two references suggests the possibility of controlling the particle size to prevent corrosion as in the present invention.

For these reasons, Appellants take the position that the rejection based on US '497 in view of Fukuda et al. should be reversed.

Remaining prior art rejections

All of the remaining prior art rejections rely on a combination of the US '497 and Fukuda et al. references further in view of one or more other references. The comments set forth above concerning the US '497 and Fukuda et al. references are equally applicable to all of these rejections, which are applied only against dependent claims in the present application. Since claim 1, the only independent claim under consideration, is patentable over US '497 and Fukuda et al. for the reasons given above, it is Appellants' position that all of these rejections should also be reversed. Appellants particularly note that none of these other references is concerned with the control of particle size, to which the present invention is directed.

Conclusion

None of the references applied by the Examiner in rejecting the claims disclose or suggest the central feature of the presently claimed invention, which is continuous strip casting of a sheet at a predetermined solidification rate ensuring material microstructure exhibiting primary particles having an average size below 1 micrometer^2. In view of this, the presently claimed invention is not obvious from the references, and all of the prior art rejections should therefore be reversed.

This Brief is submitted with the requisite fee of $540.00.

Respectfully submitted,
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Claims Appendix

1. A method of producing aluminium alloy sheet material,
which comprises:
- continuous strip casting of a sheet at a predetermined solidification rate ensuring material microstructure exhibiting primary particles having average size below 1 micrometer^2, and
- cold rolling of the strip cast sheet to an appropriate gauge with optionally intermediate annealing during the cold rolling.

2. A method according to claim 1,
wherein the sheets are further annealed during cold rolling.

3. A method according to claim 1,
wherein the alloy is cast to 4.5 mm thick strip and cold rolled to 0.58 mm followed by an intermediate annealing.

4. A method according to claim 1,
wherein the intermediate annealing is undertaken in an air furnace by heating from room temperature to 340°C at 30°C/hour and soaking at 340°C for 3 hours.

5. A method according to claim 4,
wherein after the soaking, the material is cooled from 340°C to 200°C at 50°C/hour, and the material is cooled in air.

6. A method according to claim 2,
wherein after annealing, the material was further cold rolled to 60 μm.

12. A method according to claim 2,
wherein the alloy is cast to 4.5 mm thick strip and cold rolled to 0.58 mm followed by an intermediate annealing.

13. A method according to claim 2,
wherein the intermediate annealing is undertaken in an air furnace by heating from room temperature to 340°C at 30°C/hour and soaking at 340°C for 3 hours.

14. A method according to claim 3,
wherein the intermediate annealing is undertaken in an air furnace by heating from room temperature to 340°C at 30°C/hour and soaking at 340°C for 3 hours.

15. A method according to claim 13,
wherein after the soaking, the material is cooled from 340°C to 200°C at 50°C/hour, and the material is cooled in air.

16. A method according to claim 14,
wherein after the soaking, the material is cooled from 340°C to 200°C at 50°C/hour, and the material is cooled in air.

18. A method according to claim 3,
wherein after annealing, the material was further cold rolled to 60 μm.

19. A method according to claim 4,
wherein after annealing, the material was further cold rolled to 60 μm.

20. A method according to claim 5,
wherein after annealing, the material was further cold rolled to 60 μm.

21. A method according to claim 1, wherein the continuous strip casting is at a predetermined solidification rate in the range from 10^2 to 10^3 °C/sec.

Evidence Appendix

None

Related Proceedings Appendix

None